Reducing State Fragilities

International Growth Centre

Priorities for renewable energy investment in fragile states

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In brief:

- State fragility is strongly linked to prevalent climate hazards and poor energy access. Conflict, poverty, and poor governance increase countries' vulnerability to climate change threats, while access to electricity – especially renewable – is lowest in fragile settings.
- Four key factors make the scaling of renewable energy investment in fragile and conflict-affected states desirable and relevant: cost and practicality, increased and secured energy access, economic resilience, and inclusion and empowerment.
- The massive drop in renewable energy costs makes these systems increasingly affordable and competitive options relative to fossil fuels. Solar energy has great potential in fragile settings, thanks to geographic characteristics and its incremental scalability.
- Renewable energy systems are well suited to decentralised systems. Decentralisation is fundamental in fragile, high-risk contexts by increasing the resilience of energy systems. It reduces reliance on large generators (that are often targets during conflict), involves low capital density (reducing financial risks), and sees the democratisation of power systems.
- Women in fragile economies are disproportionately affected by the negative impacts of adopting fossil fuels. Home-based solar systems offer important opportunities for economic empowerment and social inclusion.

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Energy access: State fragility and fossil fuels

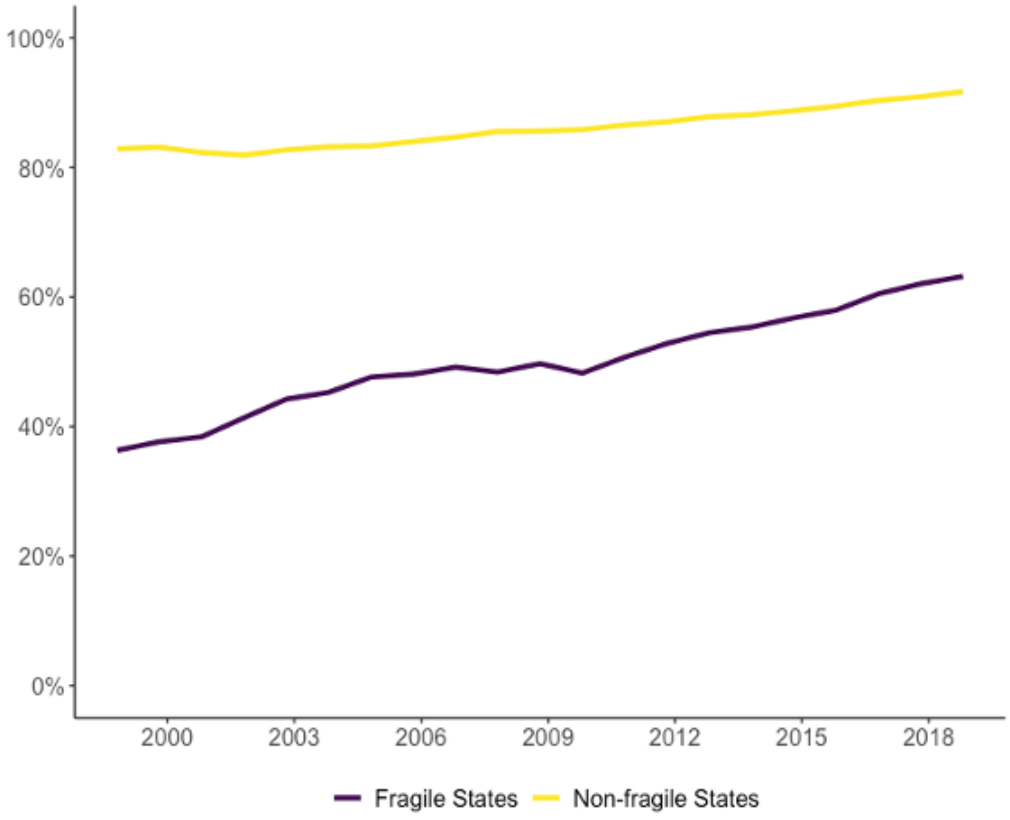
Climate change is the ultimate threat multiplier: its impacts compound the underlying vulnerabilities characteristic of fragile and conflict-affected contexts and least developed countries. There is significant overlap between climate hazard exposure and fragility risk.[1] These challenges often converge in countries that are economically reliant on climate-dependent sectors, such as rain-fed agriculture. Histories of conflict, poverty, and weak governance also serve to increase vulnerability.

The accumulation of interacting stress factors means that fragile states and the least-developed countries are affected most by climate change. For example, Nigeria, which ranked fourteenth in the 2019 Fragile States Index, experiences among the highest compound fragility-climate risks in the world. Enduring environmental stress, coupled with government mismanagement of environmental and other stressors, contributes to the instability resulting from multiple food crises and land conflicts, risking a dangerous feedback loop between fragility and climate challenges.[2]

There is also significant overlap between fragility and energy access gaps. The latest data shows that 789 million people across the world did not have access to electricity in 2018, of which, one-third lived in fragile and conflict-affected countries (see Figure 1).[3] In the same year, the number of people without access to clean cooking stood at 2.8 billion.[4] A lack of access to energy may be absolute, or in terms of reliability or affordability, which can be caused or compounded by fragility. Of the 20 least-electrified countries over the period 2010-2018, over half are on the World Bank's Harmonized List of Fragile Situations.[5][6]

[1] USAID (2018a). The intersection of global fragility and climate risks.
[2] USAID (2018b). Fragility and climate risks in Nigeria.
[3] World Bank (2013). Toward a Sustainable Energy Future for All: Directions for World Bank Group's Energy Sector.
[4] IEA et al. (2020). Tracking SDG 7 2020: The Energy Progress Report.
[5] World Bank (2020a). FY20 List of Fragile and Conflict-affected Situations.
[6] Namely, Burundi, Chad, the Democratic Republic of Congo, Liberia, Sierra Leone, South Sudan, Guinea-Bissau, Mozambique, Central African Republic, Somalia, and Zimbabwe.

Figure 1: Average access to electricity (% of total population) in USD[7]



A crucial element in decarbonising the world economy – and meeting the goals of the Paris Climate Agreement and the Sustainable Development Goals (SDGs) – will be transitioning the energy sector from dependence on polluting fossil fuels to clean, renewable energy sources. Renewable energy accounted for 17.3% of total final energy consumption globally in 2017. To achieve SDG 7.2 (increase substantially the share of renewable energy in the global energy mix by 2030) expansion of renewables must accelerate to include fragile settings, which are currently falling behind.[8]

The energy transition is inevitable, and any new fossil fuel investments run the risk of creating stranded assets. For example, Pakistan's latest long-term power capacity plan – the Indicative Generation Capacity Expansion Plan 2047 (IGCEP) – demonstrates overcapacity and stranded coal and liquefied natural gas (LNG) plants by 2030.[9] Modelling suggests that the 5.3GW of coal-fired power plants, fuelled by imported coal, expected to be operational by 2030 have a collective utilisation of just 14%, a rate at which they cannot operate commercially.[10] Renewable energy systems, therefore, represent an opportunity for those who currently do not have energy access to leapfrog the energy transition, including fragile states.

[7] World Bank (2020b). Tracking SDG 7.1.1 Electrification Dataset.

[8] IEA et al. (2020).

[9] Nicholas, S. (2020). Pakistan Risks Locking in Long-Term Overcapacity and Expensive Power Imported Coal and LNG Power Plants Are Stranded According to New Power Plan.

[10] Ibid.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A number of factors make scaling investment in renewable energy desirable, even in the context of fragile and conflict-affected situations. Here we explore these through four lenses:

1. Renewable energy: A cost-effective, practical, and scalable solution
2. Decentralised energy generation: Increased and secured access
3. Innovative financing: Unlocking energy capital in fragile settings
4. Inclusive energy distribution: Social and economic empowerment

1. Renewable energy: A cost-effective, practical, and scalable solution

Renewable energy investments make economic sense.

Renewable electricity costs have fallen sharply over the past decade. Between 2010 and 2019, the global weighted-average levelised cost of electricity of utility-scale solar photovoltaics (PV) fell 82%, while that of concentrating solar power (CSP) fell 47%, onshore wind 39%, and offshore wind 29%. For 56% of all newly commissioned utility-scale renewable power generation capacity, the costs achieved in 2019 were lower than the cheapest fossil fuel-fired option.[11]

Solar PV continues to become a cost-competitive technology choice across a wide range of countries. Although the small size of residential rooftop PV installations, relative to utility-scale solar PV, mean that their total installed costs are higher, declining costs are observed here too, between 47% and 80% over the period 2010-2019, depending on the market.[12] Cost and affordability considerations are all the more relevant in contexts suffering from a high poverty incidence, and thus, low purchasing power for the population.

However, these cost benefits are not trickling down to fragile settings, where renewable energy adoption is extremely low by international standards. Improving performance in the energy sector can help in unlocking a fragile society's economic potential. Lower energy costs can stimulate investment, the growth of enterprises, and related creation of productive private sector jobs.[13]

Solar power is scalable and has great practical potential in fragile settings.

Solar PV power represents a particularly good opportunity for fragile settings. Indeed, several fragile states in the Middle East, North Africa, and sub-Saharan

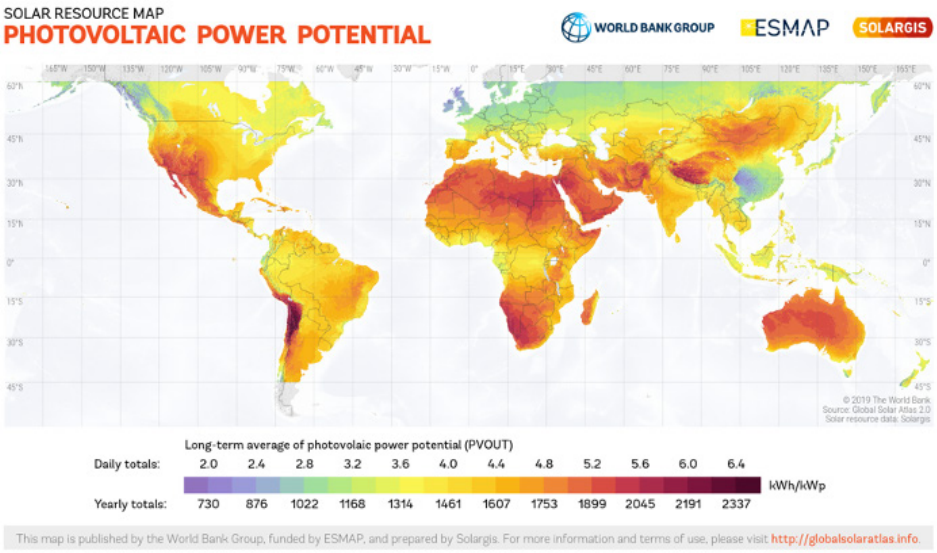
[11] IRENA (2020). Renewable Power Generation Costs in 2019, International Renewable Energy Agency.

[12] Ibid.

[13] McIntosh, K. & J., Buckley (2015). Economic development in fragile and conflict-affected states: Topic guide.

Africa have some of the highest practical potential for solar PV[14] – accounting for both the general solar resource and additional factors affecting PV conversion efficiency and basic land use constraints.[15] These include Afghanistan, Libya, Yemen, and Sudan.

Figure 2: Photovoltaic electricity potential[16]



Another feature of solar PV power, favourable to fragile settings, is its scalability. These systems use solar cells linked together in modules (solar panels), meaning that on a small scale, affordable solar home systems can be used to supply amenity power to remote, off-grid households. In East-Africa, the off-grid, pay-as-you-go market is now able to offer systems in the zero to 150-watt peak range. They are attractively priced, often require no down payment, and can run appliances such as radios, televisions, and refrigerator-freezers.[17] At a larger scale, solar PV plants, made up of thousands of solar panels, can be built incrementally.

[14] Practical solar PV potential is the power output achievable by a typical PV system (PVOUT). It simulates the conversion of the available solar resource to electric power considering the impact of air temperature, terrain horizon, and albedo, as well as module tilt, configuration, shading, soiling, and other factors affecting the system performance.

[15] Betak, J, M., Caltik, T., Cebecauer, D., Chrkavy, B., Erdelyi, R. Konstantin, M., Suri, & N., Suriova (2020). Global Photovoltaic Power Potential by Country.

[16] World Bank (2019). The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis.

[17] Mozersky, D., & D.M., Kammen (2018). South Sudan's Renewable Energy Potential: A Building Block for Peace.

2. Decentralised energy generation: Increased and secured access

Centralised energy grids are vulnerable to disruption, resulting from the physical damage caused in targeted attacks or as a by-product of wider conflict.

Attacking infrastructure is a common practice in military conflicts and electric power systems are obvious targets.[18] For example, transmission lines carrying electricity from Uzbekistan to Kabul cross through unstable areas (Dand-e-Ghori and Dand-e-Shahabuddin in Baghlan province) and are often targeted. After two years of violent civil war in Syria, more than 30 power stations were inactive and at least 40% of the country's high voltage lines had been attacked, with a total value of damage to the energy sector estimated at $648-791 million.[19]

Concentration of energy generation means that control of the grid is concentrated, predisposing centralised grids to corruption.

Fossil fuel-based power generation requires long supply lines and is associated with significant economies of scale. This method of power generation, therefore, lends itself to a centralised system which is predisposed to political corruption. Wind and solar energy are well-suited to a decentralised power system architecture because they are available everywhere, do not require long supply lines, exhibit much more modest economies of scale, and have smaller capital requirements for cost-effective power generation.[20]

Decentralised, renewable energy systems have desirable characteristics for fragile settings because they:

- Reduce reliance on a small number of large generators and on the transmission and distribution grid.
- Can use locally available renewable energy sources, which eliminates dependency on imports and the transportation of fossil fuels.

[18] Zerriffi, H., Dowlatabadi, H. & N., Strachan (2002). Electricity and Conflict: Advantages of a Distributed System, pg 55-65.

[19] Gobat, J. & K., Kostial (2016). Syria's Conflict Economy.

[20] Farrell, J. (2011). The Challenge of Reconciling a Centralized v. Decentralized Electricity System.

- Allow for a diversified energy supply, increasing resilience.
- Are modular, flexible, and less capital intensive, making them easier and quicker to build and manage in unpredictable, conflict-prone situations.
- Have a lower capital density. This reduces the overall financial risk as invested capital is distributed, and unexpected disruptions are location explicit.[21]
- May lead to democratisation of the power system.[22]

[21] Korkovelos, A. et al. (2020). Supporting Electrification Policy in Fragile States: A Conflict-Adjusted Geospatial Least Cost Approach for Afghanistan.

[22] Burke, M.J., & J.C., Stephens (2018). Political power and renewable energy futures: A critical review.

3. Innovative financing: Unlocking energy capital in fragile settings

Credit, liquidity and currency risk, small investment ticket size, due diligence challenges, and political instability prevent investors from entering underdeveloped energy access markets at scale. Since policy-driven solutions are not always possible in fragile settings, market-driven solutions may be needed to advance renewable energy deployment. An example is Peace Renewable Energy Credits (P-RECs), which are modelled on the success of renewable energy certificate markets. P-RECs are purchased by consumers interested in pursuing voluntary sustainability commitments and social responsibility objectives, in effect monetising new renewable energy generated in fragile settings.

Other innovative financing mechanisms have the potential to unlock additional private capital for energy access projects in underdeveloped energy markets. A range of these have already been pioneered for distributed renewable energy and clean cooking technologies, including result-based financing, pay-per-service models, securitisation, currency risk management instruments, crowdfunding, and project preparation facilities.[23] For example, BrightLife offers solar home systems to the poor in Uganda via pay-as-you-go (PAYG) financing. Further, the credit profiles built through the PAYG service can be used to build pathways to financial inclusion for the unbanked.

[23] Sustainable Energy for All (SEforALL) and the Climate Policy Initiative (CPI) (2019). Energizing Finance: Understanding the Landscape 2019.

4. Inclusive energy distribution: Social and economic empowerment

Renewable energy investment has the potential to produce positive impacts from a gender perspective.

In vulnerable populations, the burden of collecting fuelwood is primarily shouldered by women and children. This is a time-consuming task that detracts from child care, income-generating activities, and leisure.[24] Walking long distances in insecure areas exposes women to the risk of harassment, abduction, and rape, as well as other dangers, such as wild animal attacks.[25] Household air pollution, caused by burning biomass fuels on inefficient stoves, also disproportionately affects women, who do most of the cooking.

Women's access to economic opportunities may be further restricted by discriminatory social norms. This includes attitudes toward women's work outside the home; the types of jobs that are considered appropriate for women; who should be responsible for care and work in the home; marriage; and girls' education.[26] These adverse norms are often worse in fragile and conflict-affected countries. One third of men in fragile and conflict-affected countries say it is unacceptable for women to work outside the home if they want to, while in MENA, that proportion is as high as one half.[27]

Decentralised, renewable energy systems can drive women's use of energy for income-generating purposes, resulting in their economic empowerment.[28]

Solar home systems offer the opportunity for women to run enterprises from their home, while reducing emissions and improving health outcomes. For example, solar home systems have been used by women to establish

[24] Thulstrup, A. W. & I. Joshi, (2017). Building resilience to protracted crises through safe access to energy.

[25] Bervoets, J. & A., Thulstrup (2018). Building resilience through Safe Access to Fuel and Energy (SAFE): Moving towards a comprehensive SAFE Framework, Food and Agriculture Organization of the United Nations, Rome.

[26] Quek, Y. (2019). Women's work amid fragility and conflict: Key patterns & constraints.

[27] Ibid.

[28] Sustainable Energy for All (SEforALL) (2018). Levers of Change: How Global Trends Impact Gender Equality and Social Inclusion in Access to Sustainable Energy.

home-based phone charging micro-businesses in Tanzania and Uganda.[29] Solar Sister is an innovative social enterprise that trains and supports women entrepreneurs to build sustainable, clean energy businesses in off-grid communities in Africa. Independent research has shown that Solar Sister's model improves not only a woman's household income, but also health, education, status, and control over resources.[30]

[29] Collings, S. (2011). Phone Charging Micro-businesses in Tanzania and Uganda.

[30] Gray, L., A., Boyle & V., Yu (2017). Turning on the Lights: Transcending Energy Poverty Through the Power of Women Entrepreneurs.

Conclusion: Renewable energy as a response to COVID-19 and fragility

Developing countries and fragile states are being hit particularly hard by the COVID-19 crisis due to high informality and poor social protection coverage.

The collapse in output is global, with the biggest and most severe hardships being encountered by the poorest people, in the poorest countries of the world. Historic declines in commodity prices, tourism, and remittances, as well as unprecedented reversals in capital flows, have fuelled a deep loss of confidence and exacerbated vulnerability to other potential shocks. Developing economies also have large informal sectors, where workers lack basic social protections. Pandemic containment measures, such as lockdowns and restrictions on movement, leave informal workers at risk of income shortfalls and long-term unemployment. The scale of the problem and limited state capacity constrain policy responses.[31]

Recovery from the pandemic must 'build back better' in a way that can tackle underlying weaknesses and set a course for long-term transformation to a new form of growth and development.

A path of austerity that leads to a great depression would be particularly damaging – socially, economically, and environmentally. The only way out is sustained growth. Recovery packages will be set in a difficult macro-fiscal context, particularly for countries that cannot borrow in their own currency. In developing countries and fragile states, all sources of finance will be more constrained, and many will likely face debt difficulties. Ensuring that these countries have access to finance for investment and transformation will require something similar to a Marshall Plan, but of even greater ambition and scope.

Building state capacity is not a pre-requisite for investment in energy systems. The two can be mutually reinforcing.

The principle of simultaneously supplying services and building capacity is

[31] Bhalotia, S., Dhingra, S. & F., Kondirolli (2020). City of Dreams no More: The Impact of Covid-19 on Urban Workers in India.

exemplified by BRAC's Ultra-poor Graduation programme. The holistic approach integrates a set of interventions built around four core pillars: Livelihoods promotion, social protection, financial inclusion, and social empowerment. The programme combines asset transfer and health services components with coaching, mentoring, and community mobilisation components, to address the complex, interrelated challenges faced by the ultra-poor and enable them to progress along a pathway out of extreme poverty.

The deployment of renewable energy systems can support peacebuilding efforts.

For example, the Powering Peace Initiative recognises that introducing renewable energy capacity through internationally supported humanitarian operations can deliver short-term cost savings, while also creating a longer-term building block for peace. The initiative both creates the conditions for new clean energy investment and fosters a legacy in the form of clean energy infrastructure.

In post-conflict situations and fragile settings, the resumption of electricity supply is important in restoring confidence in the government, strengthening security, and reviving the economy.[32]

Investment in renewable energy systems should be leveraged as a tool for building state capacity.

[32] World Bank (2013).

Reducing State Fragilities (RSF) is an International Growth Centre (IGC) initiative that aims to work with national, regional, and international actors to catalyse new thinking, develop more effective approaches to addressing state fragility, and support collaborative efforts to take emerging consensus into practice. RSF brings together robust evidence and practical insight to produce and promote actionable, policy-focused guidance for national, regional, and international actors in the following areas: state legitimacy, state effectiveness, private sector development, and conflict and security. In 2019, the IGC launched the RSF initiative to carry forward the engagements started by the LSE-Oxford Commission on State Fragility, Growth and Development. RSF is funded by the UK Foreign, Commonwealth and Development Office (FCDO) and The Rockefeller Foundation.

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